

EXHIBIT 15

DATE 8-12-13

SB 144

MONTANA'S NOXIOUS WEEDS

Monica Pokorny
& Jane Mangold

EB0159



© Copyright 2010 MSU Extension

We encourage the use of this document for non-profit educational purposes. This document may be reprinted if no endorsement of a commercial product, service or company is stated or implied, and if appropriate credit is given to the author and MSU Extension. To use these documents in electronic formats, permission must be sought from the Extension Communications Coordinator, 115 Culbertson Hall, Montana State University-Bozeman, Bozeman, MT 59717; (406) 994-3273; E-mail publications@montana.edu. To order copies of this publication, contact MSU Extension Publications at (406) 994-3273.

The U.S. Department of Agriculture (USDA), Montana State University and Montana State University Extension prohibit discrimination in all of their programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Douglas L. Steele, Vice Provost and Director, Extension Service, Montana State University, Bozeman, MT 59717

We would like to thank all the reviewers and contributors who have improved the content of this booklet.

Cover Photo: Canada Thistle by Monica Pokorny

MONTANA'S NOXIOUS WEEDS

Table of Contents

Introduction	6
Montana Statewide	
Noxious Weed Priorities	8
Pink or Purple Flowers	
Canada Thistle	10
Flowering Rush	12
Houndstongue	14
Knapweeds	
Russian Knapweed	16
Spotted Knapweed	18
Purple Loosestrife	20
Eurasian Water Milfoil	22
Saltcedar	24
Blue Flowers	
Blueseed	26
Orange Flowers	
Orange Hawkweed	28
Yellow Flowers	
Common Tansy	30
Dyer's Woad	32
Leafy Spurge	34
Meadow Hawkweed Complex	36
Rush Skeletonweed	38
St. Johnswort	40
Scotch Broom	42

Sulfur Cinquefoil	44
Tall Buttercup	46
Tansy Ragwort.	48
Toadflaxes	
Dalmatian Toadflax	50
Yellow Toadflax	52
Yellow Starthistle.	54
Yellowflag Iris	56

White Flowers

Curly Leaf Pondweed	58
Diffuse Knapweed.	60
Field Bindweed	62
Hoary Alyssum	64
Hydrilla.	66
Knotweed complex	68
Oxeye Daisy	70
Perennial Pepperweed.	72
Whitetop	74

Green Flowers

Cheatgrass.	76
---------------------	----

Glossary.	78
--------------------------	-----------

Photo Credits.	80
-------------------------------	-----------

Montana County Weed Districts . . .	82
--	-----------

PLEASE NOTE:

The scientific names used in this document are the current nomenclature as provided by the USDA PLANTS Database.

Introduction

Currently, 7.6 million acres in Montana, or about 8 percent of its area, are covered with noxious weeds. Noxious weeds pose an enormous threat to our economy and environment, decrease the economic value of land and crops, decrease forage for livestock and wildlife, displace native plant species, reduce plant diversity, increase soil erosion and sedimentation, and affect recreational value. The cost of leafy spurge to grazing lands and wildlands in Montana, South Dakota, North Dakota and Wyoming is estimated at \$129.5 million annually. Knapweeds in Montana cost an estimated \$42 million annually. Identifying noxious weeds is important for early detection and eradication of new weed infestations, containment of existing infestations, preventing weed spread, and responsibly implementing weed management and monitoring programs. Minimize the threat of noxious weeds by practicing good land stewardship and applying weed prevention measures.

Using this Guide

This guide will help you identify the 32 Montana noxious weeds, 2 regulated plants, and any known toxic effects to animals or humans. If a plant is listed as toxic to one animal, it may be toxic to others, but effects may not have been evaluated. In addition, we identify weed management methods considered moderately to highly effective for each species given the size of the infestations present in Montana. Integrating the management methods may provide

the best results. Details regarding each method must be determined for your site. Sustainable land management practices and revegetation following weed management are critical for long-term control. Integrated weed management methods include:



PREVENTION

Actively forestalling contamination of a weed species.



GRAZING

Cattle, goats, and sheep can be used to control weeds.



BIOLOGICAL CONTROL

Insects, mites, nematodes, or plant pathogens used to control weeds.



HERBICIDE

Herbicides kill or stunt weeds by disrupting metabolic processes.



CULTIVATION

Brings seeds to the surface where the plant is controlled with more tillage or other methods.



HAND PULLING & DIGGING

This manual approach can remove the weed and its root system in small infestations.



CUTTING & MOWING

Prevents/reduces seed production, depletes root reserves, and favors the growth of more desired species.

Montana Statewide Noxious Weed Priorities

A weed attains a “noxious” status by Rule as described in the Montana County Weed Control Act. Noxious weeds are exotic plant species which may render land unfit for agriculture, forestry, livestock, wildlife or other beneficial uses or that harm native plant communities. The Weed Control Act declares it unlawful for any person to permit any noxious weed to propagate or produce seeds on their lands. The 32 noxious weeds and 2 regulated plants in Montana are divided into five priorities.

P1A

Priority 1A weeds are not present in Montana. Management criteria will require prevention, education, and eradication if detected.

P1B

Priority 1B weeds have limited presence in Montana. Management criteria will require eradication or containment, where present, and prevention and education elsewhere.

P2A

Priority 2A weeds are common in isolated areas of Montana. Management criteria will require containment and suppression where common, and eradication or containment, prevention, and education where less abundant. Management shall be prioritized by local weed districts.

P2B

Priority 2B weeds are abundant in Montana and widespread in many counties. Management criteria will require containment and suppression where abundant and widespread, and eradication or containment, prevention and education where less abundant. Management shall be prioritized by local weed districts.

P3

Priority 3 weeds are NOT noxious weeds, but **REGULATED PLANTS** that have potential for significant negative economic and ecological impact. Intentional spread or sale of regulated plants other than as a contaminant in agricultural products is prohibited. Research, education, prevention, and control programs, where appropriate, are recommended to minimize the spread of these weeds. Control of Priority 3 weeds is not mandated.

**Need Identification or
Management Assistance?**

For additional information,
contact your county weed district
(contacts on pages 82-83).

Canada Thistle

(*Cirsium arvense*)

Asteraceae (Sunflower family)



- **Life cycle:** Perennial
- **Root:** Horizontal and vertical
- **Leaves:** Alternate, wavy, lance shaped, lobed, spine-tipped and lack stalks; Upper leaves smaller than lower leaves.
- **Stems:** 1 to 4 feet tall, lack spines, erect, ridged, branched, and slightly hairy.
- **Flower:** Purple fading to white with diameter of 1/2 to 3/4 inch form clusters at branch ends. Bracts have weak prickles (no spines).
- **Seed/Fruit:** Long, flattened seeds with tufts of white hairs.

Integrated Management Options



Flowering Rush

(*Butomus umbellatus*)

Butomaceae (Flowering rush family)



- **Life cycle:** Perennial
- **Root:** Thick creeping rhizomes
- **Leaves:** Erect or floating leaves, opposite, 3 feet long and 1/2 inch wide with smooth edges, triangular cross section, and twisted ends.
- **Stems:** Leafless, green and triangular in cross section.
- **Flower:** Three purplish brown bracts where flower stalk attaches to stem tip. Umbrella-shaped clusters of pink to white flowers with three petals 1 inch in diameter.
- **Seed/Fruit:** Inflated, dark brown beaked fruits 1/2 inch long. Rarely produces seed.

Integrated Management Options

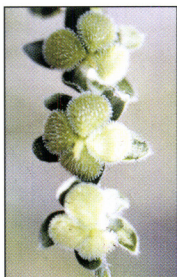


CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Houndstongue

(*Cynoglossum officinale*)

Boraginaceae (Borage family)



- **Life cycle:** Biennial
- **Root:** Taproot
- **Leaves:** Rosette leaves are up to 12 inch long, velvety, lack teeth or lobes. Stem leaves alternate and smaller toward the apex.
- **Stems:** 1 to 4 feet tall with branches near the apex.
- **Flower:** The terminal, scorpion-tail-shaped portion of the branch unrolls and displays the five-petaled, reddish purple flowers.
- **Seed/Fruit:** Four bur-like adhesive nutlets about 1/3 inch long.
- **Toxic:** Horses, cattle, sheep, goats.

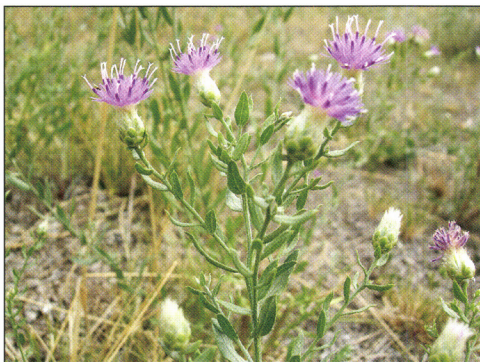
Integrated Management Options



Russian Knapweed

(*Acroptilon repens*)

Asteraceae (Sunflower family)



- **Life cycle:** Perennial
- **Root:** Rhizomatous with black, bark-like covering
- **Leaves:** Basal leaves toothed, covered with fine hairs, grayish-green. Lower stem leaves deeply lobed, 2 to 4 inches long; upper stem leaves narrow, toothed, and up to 2 1/2 inch long.
- **Stems:** One or more stems up to 3 feet tall.
- **Flower:** One purple flower head per branch tip. Bracts rounded with papery tips.
- **Seed/Fruit:** Oval, grey or ivory with long white bristles.
- **Toxic:** Horses.

Integrated Management Options



Spotted Knapweed

(*Centaurea maculosa*)
Asteraceae (Sunflower family)



- **Life cycle:** Biennial or short-lived perennial
- **Root:** Taproot
- **Leaves:** Rosette leaves are deeply lobed, grayish green, and up to 6 inches long; Stem leaves finely divided into linear segments.
- **Stems:** Up to 4 feet tall and highly branched.
- **Flower:** One pinkish-purple flower head on each branch. Bracts have dark spot on tip and fringed edges.
- **Seed/Fruit:** Black seeds 1/8 inch long.

Integrated Management Options



Purple Loosestrife

(*Lythrum salicaria*)

Lythraceae (Loosestrife family)



- **Life cycle:** Perennial
- **Root:** Short rhizomes and taproot
- **Leaves:** Clasping, lance-shaped leaves with a notched base and smooth margins are opposite or whorled on stem.
- **Stems:** 6 to 10 ft tall, square or octagonal.
- **Flower:** Clustered on vertical terminal spike extending 2 inches to 3 feet down stem, one or more flowering branches; rose to purple with four to eight petals.
- **Seed/Fruit:** Small brown capsules with many seeds.

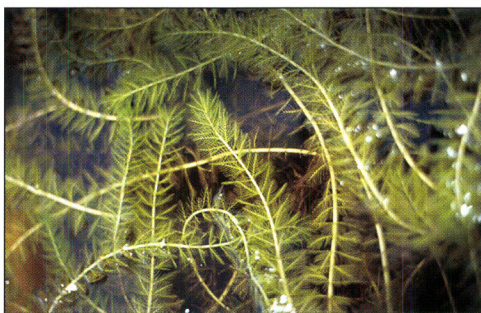
Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Eurasian Water Milfoil

(*Myriophyllum spicatum*)
Haloragaceae (Water milfoil family)



Note: In comparison, native milfoil bracts are dissected and stems usually not whitened when dry.

- **Life cycle:** Aquatic perennial
- **Root:** Numerous at base and along stem
- **Leaves:** Three to four bright-green leaves 1-1/4 inch long with 12 to 48 threadlike divisions are whorled around stem at each joint. Leaves rarely extend above water surface and mat when removed from water.
- **Stems:** Slender, hairless, leafless toward base, 10 feet long or longer and 1/10 inch thick. Grow to water surface then branch forming dense floating mats. Somewhat whitened when dry.
- **Flower:** Rigid, pink flowering spike, 2 to 8 inches long, held erect above water surface. Small, yellow, four-petaled flowers arranged in clusters. Bracts are not dissected.
- **Seed/Fruit:** Hard, segmented capsule contains four seeds.

Integrated Management Options



WATER LEVEL DRAW DOWN

CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Saltcedar

(*Tamarix ramosissima* and *T. chinensis*)

Tamaricaceae (Tamarisk family)



- **Life cycle:** Perennial deciduous or evergreen shrubs or small tree
- **Root:** Deep taproot and adventitious roots of stems and branches
- **Leaves:** Small leaves on green stems are alternate, overlapping, and appear scale-like. Foliage salty to taste.
- **Stems:** 5 to 20 feet tall, highly branched, smooth, dark brown to reddish brown bark.
- **Flower:** Small pink to white with five-petaled flowers borne in fingerlike clusters on terminal and lateral branches.
- **Seed/Fruit:** Extremely small seeds with a tuft of hairs on tip are contained in capsules.

Integrated Management Options*



*Mechanical equipment may be necessary to remove weed, followed by herbicide application to cut-stump.

Blueweed*

(*Echium vulgare*)

Boraginaceae (Borage family)

* Also known as viper's bugloss



- **Life cycle:** Biennial
- **Root:** Black taproot/fibrous lateral roots
- **Leaves:** Basal leaves narrow, 2 to 10 inches long, stalked; stem leaves alternate, smaller and stalkless near apex, all leaves covered with stiff hairs.
- **Stems:** 12 to 32 inches tall, covered with short hairs and scattered long, stiff hairs which often have swollen dark bases that form flecks.
- **Flower:** Numerous flowers 1/3 to 2/3 inch long arranged on upper side of short stems that elongate after flowering. Buds reddish purple, becoming bright blue upon flowering. Petals fused at base into a short tube that flares.
- **Seed/Fruit:** Nutlets clustered in groups of four, 1/10 inch long, greyish brown, angular, roughened, and wrinkled.
- **Toxic:** Horses, sheep.

Integrated Management Options



Orange Hawkweed

(*Hieracium aurantiacum*)

Asteraceae (Sunflower family)



- **Life cycle:** Perennial
- **Root:** Shallow, fibrous, creeping
- **Leaves:** Rosette leaves are narrow, spatula-shaped, hairy, 4 to 6 inches long, and darker green on the upper surface.
- **Stems:** 1 to 3 feet tall with bristly hairs and zero to 3 small leaves. Entire plant contains a milky juice.
- **Flower:** 5 to 30 flower heads form a compact, umbelliform inflorescence at stem apex. Flower heads have red-orange petals with notched tips.
- **Seed/Fruit:** Dark brown or black with ridges and bristly plumes.

Integrated Management Options



Common Tansy

(*Tanacetum vulgare*)

Asteraceae (Sunflower family)



- **Life cycle:** Perennial
- **Root:** Rhizomatous
- **Leaves:** Leaves alternate, consistent in size, and deeply divided into leaflets with toothed margins.
- **Stems:** 1 to 6 feet tall, often purplish red
- **Flower:** Numerous (20 to 100) yellow-orange, button-like flower heads appear in flat-topped, dense clusters on the terminal stem. Flowers lack long (ray) petals.
- **Seed/Fruit:** Yellowish brown seeds have five-toothed ridges.
- **Toxic:** Horses, cattle, humans.

Integrated Management Options



Dyer's Woad

(*Isatis tinctoria*)

Brassicaceae (Mustard family)



- **Life cycle:** Winter annual, biennial or short-lived perennial
- **Root:** Taproot and some lateral roots
- **Leaves:** All leaves bluish-green with white midrib. Rosette leaves have long slender stalks, are widest near the tip and covered with soft hairs. Stem leaves lack hairs, are alternate, lance-shaped, and clasp the stem.
- **Stems:** 1 to 4 feet tall, multi-branching.
- **Flower:** Cluster on upper stem in a flat-topped inflorescence. Yellow petals 1/8 inches long and wide.
- **Seed/Fruit:** Purplish brown, teardrop-shaped seed pods hang from small stalks.

Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Leafy Spurge

(*Euphorbia esula*)

Euphorbiaceae (Spurge family)



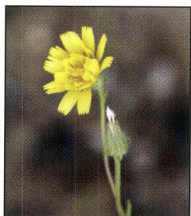
- **Life cycle:** Perennial
- **Root:** Brownish rhizomes with pink buds
- **Leaves:** Alternate, narrow, 1 to 4 inches long. Stems and leaves contain a white milky sap.
- **Stems:** Up to 3 feet tall.
- **Flower:** Seven to 10 yellowish green flowers in small clusters. The inconspicuous flower is subtended by showy, heart-shaped yellow bracts.
- **Seed/Fruit:** Oblong, grayish to purple, and borne in a three-celled fruit.
- **Toxic:** Horses, cattle, humans.

Integrated Management Options



Meadow Hawkweed Complex

(*Hieracium pratense*,
H. floribundum, *H. piloselloides*)



(*Hieracium pratense*,
H. floribundum, *H. piloselloides*)
Asteraceae (Sunflower family)

P2A

- **Life cycle:** Perennial
- **Root:** Shallow fibrous roots, stolons and rhizomes
- **Leaves:** Basal rosettes have hairy, narrow, spatula-shaped leaves, dark green above and light green below.
- **Stems:** Rosettes produce 10 to 25 flowering stems up to 3 feet tall. Stems have short, stiff hairs and few, if any, leaves. The entire plant contains a milky juice.
- **Flower:** 5 to 30, bright yellow flower heads.
- **Seed/Fruit:** Black, tiny, and plumed.

Integrated Management Options



Note: Native hawkweed species lack stolons, have leafy branched stems, and do not have an umbelliform inflorescence.

Rush Skeletonweed

(*Chondrilla juncea*)

Asteraceae (Sunflower family)



- **Life cycle:** Perennial
- **Root:** Taproot
- **Leaves:** Sharp, deeply toothed rosette leaves wither as the stem grows. Occasional narrow leaves on stem.
- **Stems:** Downward bent, reddish, coarse hairs on the lower 4 to 6 inches of green stems.
- **Flower:** Yellow flower heads 3/4 inch in diameter are scattered on the stems and branch tips. Flowers single or clusters of two to five.
- **Seed/Fruit:** Light brown to black, ribbed, and with white bristles.

Integrated Management Options

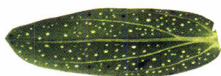


CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

St. Johnswort

(*Hypericum perforatum*)

Clusiaceae (Mangosteen family)



- **Life cycle:** Perennial
- **Root:** Taproot and lateral roots
- **Leaves:** Oval-shaped leaves up to 1 inch long are opposite, lack stalks and teeth, are darker green above, and have in-rolled edges and tiny transparent dots on the surface.
- **Stems:** 1 to 3 feet tall, reddish with black glands, erect, with two opposite longitudinal ridges; may branch many times near the top.
- **Flower:** Numerous five-petaled yellow flowers form flat-topped clusters on terminal branches. Flowers are up to 1 inch in diameter and bloom from the center out. Black glands along the petal margins.
- **Seed/Fruit:** Rust colored seeds pods are 1/4 inch long and contain numerous seeds in three-pointed capsules.
- **Toxic:** Horses, cattle, sheep.

Integrated Management Options



Scotch Broom

(*Cytisus scoparius*)

Fabaceae (Legume family)



- **Life cycle:** Perennial evergreen shrub
- **Root:** Taproots and lateral roots
- **Leaves:** Consist of three 1/2 inch long rounded leaflets.
- **Stems:** Up to 10 feet tall, mostly erect, stiff, angled and dark green stems.
- **Flower:** Bright yellow, pea-like, 3/4 to 1 inch flower, borne in angle between leaf and stem.
- **Seed/Fruit:** Pods are brown to black, smooth and flat with white hairs, and contain several shiny green-brown seeds.
- **Toxic:** Horses, sheep.

Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Sulfur Cinquefoil

(*Potentilla recta*)

Rosaceae (Rose family)



Note: These characteristics distinguish sulfur cinquefoil from native cinquefoils. Sulfur Cinquefoil leaves are green, not silvery, on the underside; its seeds are ridged while others usually are not; it has comparatively more stem leaves and fewer basal leaves than other *Potentilla* species, and its hairs are at right angles to the stem while others are usually oppressed.

- **Life cycle:** Perennial
- **Root:** Fibrous spreading roots
- **Leaves:** Palmately compound with five to seven toothed leaflets; relatively few basal leaves. Most leaves grow along upright stem. Leaves stalked; leaf stalk length and size decreasing toward apex.
- **Stems:** One to several erect stems 1 to 2 feet tall, may be branched with terminal, multi-flower inflorescence. Stems have hairs perpendicular to stem and leafstalks.
- **Flower:** Five light yellow petals with deeply notched tips and a yellow center.
- **Seed/Fruit:** Comma-shaped, brownish purple, covered with net-like ridges.

Integrated Management Options



Tall Buttercup

(*Ranunculus acris*)

Ranunculaceae (Buttercup family)



Note: Montana has many native buttercup species. Take a sample to the county weed district for positive identification.

- **Life cycle:** Perennial
- **Root:** Hairy, fibrous, and occasionally rhizomatous
- **Leaves:** Hairy leaves deeply lobed (nearly to the base) into three to five segments with each segment lobed again; Leaves decrease in size toward stem apex; uppermost leaves have three to four narrow segments.
- **Stems:** Up to 3 feet tall, branched and hairy.
- **Flower:** Glossy yellow flowers in clusters, 3/4 to 1 inch in diameter with greenish center.
- **Seed/Fruit:** Disc-shaped, reddish brown with short hook.
- **Toxic:** Horses, cattle, sheep, goats.

Integrated Management Options



Tansy Ragwort

(*Senecio jacobaea*)

Asteraceae (Sunflower family)



- **Life cycle:** Biennial or short-lived perennial
- **Root:** Taproot
- **Leaves:** Rosette has 10 to 20 leaves with web-like hairs. Basal leaves 2 to 10 inches long, lobed into leaflets and leaflets lobed again. Stem leaves alternate, evenly distributed, lower leaves larger, with strong odor when crushed.
- **Stems:** Commonly 1 to 3 feet tall but up to 6 feet. Several or solitary stems may branch near the terminal inflorescence. Stems and leaf stalks often purplish and have cobwebby hairs.
- **Flower:** Daisy-like flower heads, yellow petals, yellow center, less than 1 inch diameter, clustered on terminal stem.
- **Seed/Fruit:** Tiny and tipped by hairlike plumes.
- **Toxic:** Horses, cattle, sheep, goats, humans.

Integrated Management Options



Dalmatian Toadflax

(*Linaria dalmatica*)

Scrophulariaceae (Figwort family)



- **Life cycle:** Perennial
- **Root:** Taproot and horizontal roots with adventitious buds
- **Leaves:** Leaves and stems waxy, pale green to bluish green. Heart-shaped leaves alternate with smooth edges, and clasp stem.
- **Stems:** Up to 3 feet tall, robust.
- **Flower:** Develop at base of the upper leaves, snapdragon-like, bright yellow with an orange throat and a long spur.
- **Seed/Fruit:** Irregular angled seeds in two-celled capsule.

Integrated Management Options



Yellow Toadflax

(*Linaria vulgaris*)

Scrophulariaceae (Figwort family)



- **Life cycle:** Perennial
- **Root:** Creeping rhizomes
- **Leaves:** Numerous, alternate, pale-green to gray-green, individually connected to the stem, long (2 1/2 inches long or longer) and narrow, pointed at both ends, with smooth edges.
- **Stems:** 8 to 24 inches tall, usually not branched.
- **Flower:** Yellow, snapdragon-like flowers with orange throat, 1 to 1 1/4 inch long with downward spur (1 inch long), on short stalks in dense clusters at top of stems.
- **Seed/Fruit:** Capsule brown, round to oval with two compartments. Seeds dark brown to black, less than 1/10 inch diameter, flattened, with papery circular wing.

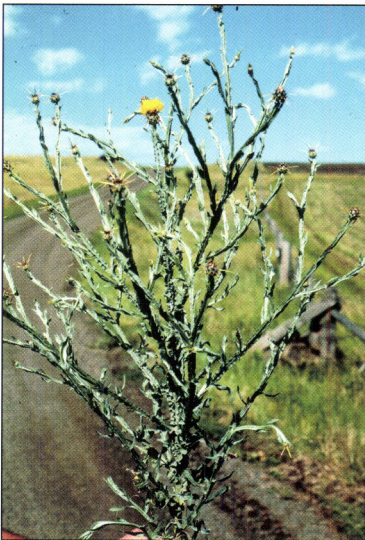
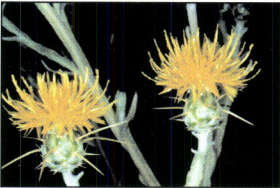
Integrated Management Options



Yellow Starthistle

(*Centaurea solstitialis*)

Asteraceae (Sunflower family)



- **Life cycle:** Annual
- **Root:** Taproot
- **Leaves:** Rosette leaves are deeply lobed with pointed tip. Stem leaves are vertical, flat extensions along the stem and covered with cottony hairs.
- **Stems:** Up to 5 feet tall, rigid.
- **Flower:** One yellow flower head per branch. Sharp, straw-colored spines up to 3/4 inch long radiate from the bracts. After seed dispersal, a cottony tuft remains on stem.
- **Seed/Fruit:** Light to dark-colored with or without bristles.
- **Toxic:** Horses.

Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Yellowflag Iris

(*Iris pseudacorus*)

Iridaceae (Iris family)



- **Life cycle:** Perennial
- **Root:** Bulbs and rhizomes
- **Leaves:** Long, linear, dark green leaves emerge from ground in fanlike arrangement. Smooth edged, mostly basal leaves are flattened, sword-like with a pointed tip and raised midrib, and erect with upper part arching.
- **Stems:** 3 to 4 feet tall, round to flattened.
- **Flower:** Large pale to deep yellow flowers have three downward- and three upward-pointing petals, some with light-brown to purple veins or flecks.
- **Seed/Fruit:** Three-angled cylindrical capsule 1 to 4 inches long contains many flat brown seeds.
- **Toxic:** Horses, cattle, sheep, goats.

Integrated Management Options



Curly Leaf Pondweed

(*Potamogeton crispus*)

Potamogetonaceae (Pondweed family)



Life cycle: Aquatic perennial

Root: Creeping rhizomes

Leaves: Sessile, oblong, stiff, $1\frac{1}{2}$ – 4 inches long, $\frac{1}{5}$ – $\frac{2}{5}$ inch wide, and translucent. Similar to other *Potamogeton* species, but the only one with curly leaf edges (like lasagna noodles), and tiny serrations on edges.

Stems: Compressed, four-angled, with few branches, up to $31\frac{1}{2}$ inches long and less than $\frac{1}{10}$ inch wide.

Flower: Cream to brown, inconspicuous, bloom on short emergent spike (less than $\frac{4}{5}$ inch) with up to 10 flowers per spike.

Seed/Fruit: Small, flat, with pointed beak, $\frac{1}{5}$ inch long. Seeds not a major form of spread. Has hard vegetative buds (turions) in leaf axils that are $\frac{1}{5}$ – $\frac{2}{5}$ inch long.

Integrated Management Options



Diffuse Knapweed

(*Centaurea diffusa*)

Asteraceae (Sunflower family)



Life cycle: Biennial or short-lived perennial

Root: Taproot

Leaves: Seedlings have finely divided leaves with small hairs. Mature leaves are divided into linear segments, broadly lance-shaped, grayish-green, covered with wooly hairs, and alternate.

Stems: Up to 2 feet tall and highly branched.

Flower: White or pink flower head. Bracts form stiff, cream- to brown-colored spines divided into comblike teeth.

Seed/Fruit: Brown or grayish.

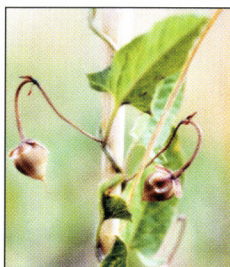
Integrated Management Options



Field Bindweed

(*Convolvulus arvensis*)

Convolvulaceae (Morning-glory family)



Life cycle: Perennial

Root: Taproot with lateral roots

Leaves: Dark green, arrowhead-shaped with sharp pointed lobes are alternate and grow on one side of the stem.

Stems: 1 to 4 feet long, growing horizontally or climbing.

Flower: One inch in diameter, tubular or bell-shaped, and white to pinkish. Two bracts on stem below flower.

Seed/Fruit: Four seeds per small round fruit.

Toxic: Horses.

Integrated Management Options



Hoary Alyssum

(*Berteroa incana*)

Brassicaceae (Mustard family)



Life cycle: Biennial

Root: Taproot

Leaves: All are greyish-green with star-shaped hairs. Basal leaves 1 to 2 inch long with slender stalks. Stem leaves face upward, pressed to stem. Lower leaves with short stalks, upper leaves lack stalks.

Stems: 1 to 3½ feet tall, erect, branched, covered with star-shaped hairs.

Flower: White, 1/10 to 2/10 inch long, deeply notched petals on slender stalks. Sepals hairy and drop off.

Seed/Fruit: Flattened oval seed pods 2/10 to 3/10 inch long with star-shaped hairs close to stem; styles remain. Pod chambers contain 3 to 7 seeds.

Toxic: Horses.

Integrated Management Options



Hydrilla

(*Hydrilla verticillata*)

Hydrocharitaceae (Frog's-bit family)



Life cycle: Aquatic perennial

Root: Underground rhizomes and above ground stolons; forms tubers

Leaves: Small (5/8 inch long), with saw-toothed margins, pointed tips, in whorls of 4-8. Sharp teeth on

mid-vein on lower leaf surface. Green and translucent, but can bleach in sun or turn yellow to brownish-green from disease.

Stems: Submersed, slender (about 1/32 inch thick), sinewy and long (up to 25 feet).

Flower: Female: solitary, tiny, white, six-petaled (1/16 inch long), and float on the surface from a long threadlike stalk. Male: tiny, greenish, break loose and rise to the surface to float and pollinate female flowers. Plants may be dioecious or monoecious.

Seed/Fruit: Tiny seed (less than 1/16 inch); reproduction by stem fragmentation, and re-growth from stolons, runners, rhizomes, tubers and turions.

Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Knotweed complex:

Japanese Knotweed (*Polygonum cuspidatum*)

Giant Knotweed (*P. sachalinense*)

Himalayan Knotweed (*P. polystachyum*)

Polygonaceae (Buckwheat family)



Life cycle: Herbaceous perennial

Root: Rhizomatous

Leaves: Alternate, stalked, broadly oval to triangular and pointed at the tip. Giant knotweed leaves are 1 foot long or longer and 2/3 as wide.

Japanese knotweed leaves are 6 inches long by 3 to 4 inches wide. Himalayan knotweed leaves are 4 to 8 inches long with tapered tips and elongated tips, base slightly heart-shaped, and often with soft hairs on veins, margins and lower surfaces.

Stems: Hollow, smooth, weakly woody, jointed, swollen at nodes, 12 feet tall or taller; base surrounded by membranous sheath.

Flower: Small greenish white flowers in sprays at branch tip. Japanese knotweed inflorescence is larger than that of giant knotweed; the flowers are prominently winged, and their size increases significantly with age.

Seed/Fruit: Black with ribs.

Toxic: Horses, cattle, goats.

Integrated Management Options



CONTACT A WEED PROFESSIONAL IMMEDIATELY IF FOUND

Oxeye Daisy

(*Chrysanthemum leucanthemum*)

Asteraceae (Sunflower family)



Life cycle: Short-lived perennial

Root: Shallow, branched rhizomes

Leaves: Basal and lower stem leaves on long narrow stalks have rounded teeth, are 2 to 5 inches long and widest at tip. Upper stem leaves smaller toward apex, have no stalk, and are toothed.

Stems: 1 to 2 feet tall, simple or once-branched, smooth.

Flower: One 1 to 2 inch diameter flower head per stem with white outer petals and a yellow center.

Seed/Fruit: Black with ribs.

Integrated Management Options



Perennial Pepperweed

(*Lepidium latifolium*)

Brassicaceae (Mustard family)



Life cycle: Perennial

Root: Deep spreading roots

Leaves: Bright green to gray green, broadest at base and tapering to pointed tip, with prominent whitish midvien. Basal leaves are up to 13 inches long and 4 inches wide with long stalks, covered with a waxy layer. Stem leaves smaller with smaller stalks, alternate, and do not clasp stem.

Stems: 1 to 3 feet tall but up to 6 feet tall.

Flower: Small, less than 1/8 inch wide with four white petals, and are borne in dense, rounded clusters on terminal branches.

Seed/Fruit: Flat, rounded, slightly hairy, 1/16 inch long, reddish brown capsule contains two tiny seeds.

Integrated Management Options



Whitetop*

(*Cardaria draba*)

Brassicaceae (Mustard family)

* Also known as hoary cress



Life cycle: Perennial

Root: Rhizomatous and 2 to 3 feet deep

Leaves: Blue green to gray green leaves are alternate, covered with soft white hairs, and lance- to arrowhead-shaped. Lower leaves stalked; upper leaves clasp stem.

Stems: Up to 2 feet tall.

Flower: Numerous white flowers with four petals borne on 1/2 inch long stalk. Dense clusters create white, flat-top appearance.

Seed/Fruit: Seed capsules heart-shaped with two reddish brown seeds.

Toxic: Cattle.

Integrated Management Options



Cheatgrass

(*Bromus tectorum*)

Poaceae (Grass family)



- **Life cycle:** Annual or winter annual
- **Root:** Finely divided and fibrous
- **Leaves:** Light green and hairy; sheaths fused to the node at the bottom; upper leaf sheaths may be smooth, but lower sheaths are hairy: each leaf has a membranous ligule where it separates from the stem.
- **Stems:** 4 - 30 inches tall; slender and erect; slightly hairy.
- **Flower:** Light green; occur in a nodding, open inflorescence; color changes from green to purple to brown as plant matures.
- **Seed/Fruit:** 3/8 inch long seed, with an awn equal to or greater than length of the seed.

Integrated Management Options



Glossary

- adventitious roots** Roots appearing in an unusual or unexpected place on a plant.
- alternate** Referring to a leaf or bud arrangement in which there is one bud or one leaf at a node.
- annual** A plant that lives one year or less. A winter annual germinates late one growing season and produces seed and dies during the next growing season.
- basal** Refers to the base of the plant.
- biennial** A plant that lives for two growing seasons, normally producing a basal rosette the first year and the flower and fruit the second year.
- bract** A small leaf-like structure surrounding or enclosing the flower, usually below the petals.
- capsule** Dry fruit with more than one seed.
- clasping** Partly surrounding the stem.
- dioecious** Only male or only female flowers on a single plant.
- fibrous roots** Root system with many, fine, diffuse roots.
- flower head** A cluster of individual flowers in one compact unit, usually referring to compound flower of the Sunflower Family members.
- inflorescence** One or more flowers which comprise the flowering part of the plant.
- lobed** Divided less than one-half the distance to the base or midvein, usually rounded or obtuse.
- midrib** The central axis or vein of the leaf blade or leaflet.
- monoecious** Plants with male and female flowers on the same plant.
- noxious weeds** Invasive plant which a landowner has a legal responsibility to control, based on the Montana Noxious Weed Law.
- nutlet** Hard, small, one-seeded fruit, usually referring to fruits of the Boraginaceae members.

opposite Term applied to leaves or buds occurring in pairs at a node.

palmate Leaflets, lobes, or veins which arise from the same point at the tip of the stalk.

perennial Plants which live two or more years.

pinnate Leaflets or lobes developing from several different points on the main leaf axis.

plume A hairlike or featherlike structure, often on a seed.

rhizomatous Having rhizomes.

rhizome A horizontal stem growing beneath the ground which can develop roots or sprouts at the joints.

rosette A cluster of leaves radiating out from the base of the plant.

sepal One of the outermost flower structures, usually enclosing the other flower parts in the bud.

spur Any long, narrow (sometimes tubular) extension of a petal.

stolon A horizontal stem growing above the ground which can develop roots or sprouts at the joints.

taproot The primary descending root along the vertical axis of the plant which is larger than the branching roots.

terminal Borne at or belonging to the extremity or summit.

tubers Short, thickened, potato-like underground stems that function in food storage, reproduction, or both.

turion An overwintering bud produced by aquatic herbs, often rich in starch and sugars enabling them to act as storage organs.

umbelliform inflorescence A many flowered inflorescence in which the flowers' stems arise from a common point, ascend in all directions, and form a relatively level-topped flower cluster.

Photo Credits

R-rosette; **P**-plant; **F**-flower; **O**-other; **S**-seed

Canada Thistle

R-MSU; P-S. Dewey, USU, BW; F-M. Pokorny

Flowering Rush

R-M. Tu, TNC; P-M. Tu, TNC; F-J. Randall, TNC

Houndstongue

R-MSU; P-J. Randall; F-MSU

Russian Knapweed

R-MSU; P-J. Randall/TNC; F-M. Pokorny

Spotted Knapweed

R-S. Dewey, USU, BW; P-S. Dewey, USU, BW; S-M. Pokorny

Purple Loosestrife

R-C. Randall, USDA-FS, BW; P-B. Mullin; F-N. Rees, USDA-ARS, BW

Eurasian Water Milfoil

R-J.K. Clark; P-A. Fox, U of FL, BW; F-L. Mehrhoff, U of CT, BW

Saltcedar

R-S. Dewey; P-M. Pokorny; F-S. Dewey

Blueweed

P-R. Olson, XID Services, BW; F-R. Olson, XID Services, BW

Orange Hawkweed

R-C. Duncan; P-MT Noxious Weed Awareness; F-Univ. AK, BW;
O-M. Shepard, USFS, BW

Common Tansy

R-R. Old, XID Services, BW; P-M. Shephard, USDA-FS, BW; F-M. Pokorny

Dyer's Woad

R-S. Dewey, USU, BW; P-S. Dewey, USU, BW; F, S-M. Pokorny

Leafy Spurge

R-N. Rees, USDA-ARS, BW; P-B. Rice; F-M. Pokorny; O-M. Pokorny

Meadow Hawkweed Complex

R-MT Noxious Weed Awareness; P-R. Old, XID Services, BW;
F-E. Bella, USDA-FS, BW

Rush Skeletonweed

R-MSU; P-Sanders County; F-MSU; O-MSU

St. Johnswort

R-S. Dewey, USU, BW; P-MSU; F, O-MSU

Scotch Broom

R-T. Heutte, USFS, BW; P-S. Dewey, USU, BW; F-B. Rice/TNC;
O-W. Ciesla, Forest Health Mgmt, BW

Sulfur Cinquefoil

R-MSU; P-P. Lesica; F-MT Noxious Weed Awareness; O-MSU

Tall Buttercup

R-J. Cardina, Ohio State, BW; P-P. Lesica; F-MSU

Tansy Ragwort

R-USU, BW; R-MSU; P-E. Coombs, BW; F-M. Shephard, USDA-FS, BW

Dalmatian Toadflax

R-L. Wilson, U of ID, BW; P-USU, BW; F-MSU

Yellow Toadflax

R-S. Dewey, USU, BW; P-L. Wilson, U of ID, BW; F-M. Shephard

Yellow Starthistle

R-S. Dewey, USU, BW; P-S. Dewey, USU, BW; F-MSU; O-MSU

Yellowflag Iris

R-B. Rice/TNC; P-J. Randall/TNC; F-MSU

Curlyleaf Pondweed

R-USDA Plants Database; P-L. Mehrhoff, U of CT, BW; F-F. Koshere, WI DNR

Diffuse Knapweed

R-R. Old, XID Services, BW; P-S. Dewey; F-C. Roche

Field Bindweed

P-B. Rice/TNC; F-M. Pokorny; O-J. Randall/TNC

Hoary Alyssum

P-R. Old, XID Services, BW; F-J. Randall/TNC

Hydrilla

R-L. Mehrhoff, U of CT, BW; P-G. Lovell, AL Dept. CNR, BW; F-M. Frank, BW

Knotweed complex

P-T. Huette, USDA-FS, BW; F-R. Old, XID Services, BW; O-L. Mehrhoff, U of CT, BW

Oxeye Daisy

R-MSU; P-M. Harte, BW; F-MSU

Perennial Pepperweed

R-MSU; P-MSU; F-L. Mehrhoff, U of CT, BW; O-M. Pokorny

Whitetop

R-S. Dewey, USU, BW; P-C. Evans; F-MSU

Cheatgrass

R-C. Evans, River to River CWMA, BW; P-R. Old, XID, BW; F-L. Mehrhoff, U of CT, BW

*TNC is The Nature Conservancy; BW is Bugwood.org

Montana County Weed Districts

All Area Codes are (406)

Anaconda / Deer Lodge

563-4055

800 S. Main
Anaconda 59711

Beaverhead • 683-3790

2 S. Pacific
Dillon 59725

Big Horn • 256-2731

P.O. Box 99
Hardin 59034

Blackfeet Reservation

338-2946

P.O. Box 2804
Browning 59417

Blaine • 357-2340

P.O. Box 1212
Chinook 59523

Broadwater • 266-9243

515 Broadway
Townsend 59644

Carbon • 962-3967

P.O. Box 255
Joliet 59041

Carter • 775-6204

P.O. Box 315
Ekalaka 59324

Cascade • 454-6920

279 Vaughn S. Frontage Road
Great Falls 59404

Chouteau • 622-5824

P.O. Box 459
Fort Benton 59442

Crow Tribe • 638-4411

P.O. Box 69
Crow Agency 59022

Custer • 874-3370

1010 Main Courthouse
Miles City 59301

Daniels • 487-2861

P.O. Box 187
Scobey 59263

Dawson • 377-6546

207 W. Bell
Glendive 59330

Fallon • 778-7110

P.O. Box 850
Baker 59313

Fergus • 535-3970

P.O. Box 878
Lewistown 59457

Flathead • 758-5798

309 FFA Drive
Kalispell 59901

Flathead Agency • 675-2700

P.O. Box 278
Pablo 59855

Fort Belknap Agency

353-2901

RRI Box 980
Harlem 59526

Fort Peck Tribes • 768-3928

P.O. Box 1027
Poplar 59255

Gallatin • 582-3265

901 N. Black
Bozeman 59715

Garfield • 557-2770

P.O. Box 81
Jordan 59337

Glacier • 873-4362

512 E. Main
Cut Bank 59427

Golden Valley • 323-2704

116 1st St. West
Roundup 59072

Granite • 859-3304

P.O. Box 665
Philipsburg 59858

Hill • 265-4453

1405 W. 2nd St.
Havre 59501

Jefferson • 225-4165

Box H
Boulder 59632

Judith Basin • 566-2241

P.O. Box 503
Stanford 59479

Lake • 883-7330

P.O. Box 670
Pablo 59855

Lewis & Clark • 447-8346

100 W Custer Ave.
Helena 59601

Liberty • 759-5673

P.O. Box 451
Chester 59522

Lincoln • 293-7781, ext. 260

418 Mineral Ave.
Libby 59923

Madison • 842-5595

P.O. Box 278
Virginia City 59755

McCone • 485-2493

P.O. Box 200
Circle 59215

Meagher • 547-2196

P.O. Box 309
White Sulphur Springs 59645

Mineral • 822-3547

Box 730
Superior 59872

Missoula • 258-4200

2825 Sante Fe Court
Missoula 59808

Musselshell • 323-2704

116 1st St. West
Roundup 59072

Northern Cheyenne Tribe**477-6498**

P.O. Box 128
Lame Deer 59043

Park • 222-4158

414 E. Callender
Livingston 59047

Petroleum • 429-2037

P.O. Box 226
Winnett 59087

Phillips • 654-2543

P.O. Box 430
Malta 59538

Pondera • 271-5672

#8 Airport Road
Conrad 59425

Powder River • 436-2382

P.O. Box 200
Broadus 59317

Powell • 846-3348

422 Fairgrounds Road
Deer Lodge 59722

Prairie • 635-4433

P.O. Box 7
Terry 59349

Ravalli • 777-5842

329 Airport Rd.
Stevensville 59870

Richland • 433-9047

2648 W. Holly
Sidney 59270

Rocky Boy Tribe • 395-4207

RR1 Box 542
Box Elder 59521

Roosevelt • 787-5312

P.O. Box 416
Culbertson 59218

Rosebud • 346-7608

P.O. Box 962
Forsyth 59327

Sanders • 826-3487

36 Airport Road
Plains 59859

Sheridan • 765-3415

100 W. Laurel Ave.
Plentywood 59254

Silver Bow • 497-6460

155 W. Granite
Butte 59701

Stillwater • 322-1106

P.O. Box 795
Columbus 59019

Sweet Grass • 932-5146

P.O. Box 640
Big Timber 59011

Teton • 466-2155

P.O. Box 1312
Choteau 59422

Toole • 434-2742

P.O. Box 567
Shelby 59474

Treasure • 342-5549

P.O. Box 163
Hysham 59038

Valley • 228-6237

501 Court Square, Box 13
Glasgow 59230

Wheatland • 632-4138

P.O. Box 465
Harlowtown 59036

Wibaux • 796-2625

P.O. Box 31
Wibaux 59353

Yellowstone • 256-2731

3319 King Ave. E.
Billings 59101



In Partnership With:

Montana Department of Agriculture

Montana Weed Control Association